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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/574,762

10/10/2006

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NAKAI-007US

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EXAMINER

PALMER, TIFFANY

ART UNIT

PAPER NUMBER

4172

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/574,762	<b>Applicant(s)</b> SAITO ET AL.	
	<b>Examiner</b> TIFFANY PALMER	<b>Art Unit</b> 4172	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☒ Claim(s) 1-8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 4/05/2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/05/2006</u> .   | 6) <input type="checkbox"/> Other: ____.                          |

## DETAILED ACTION

### *Claim Objections*

1. Claim 1 is objected to because of the following informalities: the word "sharing" should be changed to -shearing- in the phrase "adding frother to said flurry and collector to which the **sharing** force is added". Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Styron et al., U.S. Patent Number 6,068,131 in view of Gray et al., U.S. Patent Number 6,126,014.

5. With regard to Claim 1, Styron et al. teach a method of removing unburned carbon from fly ash comprising the steps of:  
adding water to fly ash to produce slurry (Column 3, lines 32-34, Column 4, line 1);

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adding collector (conditioning agent) to said slurry (Column 4, lines 4-5);  
feeding said slurry and collector to a submerged agitator (immersed in conditioning tank) (Column 4, lines 15-16);  
adding frother (flotation reagent) to said slurry and collector to which the shearing force is added (Column 4, lines 10-11);  
agitating said slurry and collector to generate air bubbles (aerated) (Column 4, lines 18-23);  
and adhering unburned carbon of said fly ash to the air bubbles to rise said unburned carbon (Column 4, lines 19-23).

Styron et al. do not teach a submerged agitator having a rotation shaft penetrating a cylindrical main body in an axial direction thereof, plurality of chambers formed by dividing an inside of the main body in the axial direction thereof and an agitating vane fixed to the rotation shaft and rotating in each chamber, and adding shearing force to said slurry and collector.

In an analogous art of carbon ash beneficiation, Gray et al. teach a cylindrical main body in an axial direction thereof, plurality of chambers formed by dividing an inside of the main body in the axial direction thereof and an agitating vane fixed to the rotation shaft and rotating in each chamber, and adding shearing force (inherent to any agitation acting perpendicular to its longitudinal axis) to said slurry and collector for the benefit of increasing carbon yield for the improvement of carbon fly ash beneficiation (Gray, Figure 1 and Column 4, lines 54-58).

It would have been obvious to one of ordinary skill in the art at the time of

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invention to include the Gray agitator characterized by its rotation shaft penetrating the cylindrical main body in an axial direction thereof, plurality of chambers, and multiple vanes in the Styron apparatus for the benefit of increasing carbon yield for the improvement of carbon ash beneficiation

With regard to Claim 2, the art combination does not explicitly teach a method of removing unburned carbon from fly ash wherein said agitating force when the submerged agitator add shearing force to said slurry and said collector is 0.7 kWh/m<sup>3</sup> or more and 10 kWh/m<sup>3</sup> or less per unit quantity of slurry.

However, such rates are well known and are result effective variables. Where the general conditions of a claim are disclosed in the prior art it is not inventive to discover the optimum or workable ranges by routine experimentation. It would have been obvious to one of ordinary skill in the art at the time of invention to recognize that the amount of force being claimed is merely a design choice and the amount (force) of agitation would have been optimized to provide adequate shearing force to the slurry and collector.

With regard to Claim 3, Styron et al. teach a method of removing unburned carbon from fly ash wherein concentration of said fly ash in the slurry is 0.1 percent to 70 percent (which reads on the claimed 3 weight percent or more and 50 weight percent or less). (Styron, Column 4, lines 1-2)

With regard to Claim 4, Styron et al. teach a method of removing unburned carbon from fly ash wherein amount of said collector added is 0.1 lbs/ton (0.00499 wt

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%) to 10 lbs/ton (0.4975 wt %) which reads on 5 weight percent or more, and 100 weight percent or less of amount of said unburned carbon of said fly ash (Styron, Column 4, lines 7-9). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to so include the claimed ranges since the prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties.

With regard to Claim 5, Styron et al. do not teach the method of removing unburned carbon from fly ash further comprising the steps of separating with a solid/liquid separation device water of fly ash slurry that is separated through flotation, and water separated is added to new fly ash or/and the water is used to erase bubbles when adhering unburned carbon to air bubbles, for purpose of reuse.

In an analogous art of carbon ash beneficiation, Gray et al. teach the method of removing unburned carbon from fly ash further comprising the steps of separating with a solid/liquid separation device, water of fly ash slurry that is separated through flotation, and water separated is added to new fly ash or/and the water is used to erase bubbles when adhering unburned carbon to air bubbles, for purpose of reuse (Gray, Column 5, lines 11-23 and Figure 1).

It would have been obvious to one of ordinary skill in the art at the time of invention to include the steps of using a solid/liquid separation device to separate the water of the fly ash slurry included in Gray et al.'s disclosure in the Styron apparatus for the benefit of recycle and reuse for the improvement of carbon ash beneficiation.

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With regard to Claim 6, the method of removing unburned carbon from fly ash wherein said unburned carbon is used as fuel is well known and would have been obvious to so include for any conventional use envisioned by the practitioner.

With regard to Claim 7, Styron et al. teach a method of removing unburned carbon from fly ash wherein said unburned carbon content in said fly ash is 1 weight percent or less and the fly ash is used as a mixing material for cement (concrete applications) (Styron, Column 4, lines 26-28).

With respect to claim 7, the claimed limitation of 1 wt % or less of unburned carbon content in said fly ash reads on 0 wt %. Although Styron et al. are silent to the content of unburned carbon, note that where the general conditions of the claim are disclosed in the prior art, it is not inventive to disclose the optimum or workable ranges by routine experimentation.

With regard to Claim 8, Styron et al. teach a method of removing unburned carbon from fly ash as claimed one of claims 1 to 6, wherein said unburned carbon content of in fly ash separated through flotation is 1 weight percent or less and the fly ash is used as a material for manufacturing lightweight aggregate (coke, charcoal, briquets) (Styron, Column 4, lines 24-26).

With respect to claim 8, the claimed limitation of 1 wt % or less of unburned carbon content in said fly ash reads on 0 wt %. Although Styron et al. are silent to the content of unburned carbon, note that where the general conditions of the claim are

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disclosed in the prior art, it is not inventive to disclose the optimum or workable ranges by routine experimentation.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TIFFANY N. PALMER whose telephone number is (571)270-3666. The examiner can normally be reached on Monday-Friday 8:30am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Angela Ortiz can be reached on (571)272-1206. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TNP

***/Angela Ortiz/***

***Supervisory Patent Examiner, Art Unit 4172***